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Two new species of *Habrocestum* Simon, 1876 (Araneae: Salticidae: Hasariini) from Western Ghats, India

Два новых вида рода рода *Habrocestum* Simon, 1876 (Araneae: Salticidae: Hasariini) из Западных Гат, Индия

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KEY WORDS: Biodiversity hotspot, Kerala, Shendurney Wildlife Sanctuary, taxonomy.
КЛЮЧЕВЫЕ СЛОВА: Центр биоразнообразия, Керала, заповедник Шендерни, таксономия.

ABSTRACT. Two new species of *Habrocestum* Simon, 1876 are described from Shendurney Wildlife Sanctuary, Kerala, India: *H. shendurneyensis* sp.n. (♂♀) and *H. kerala* sp.n. (♂). Detailed descriptions, diagnostic features, and illustrations are given. A map showing collecting localities of all known *Habrocestum* species from India is also provided.

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РЕЗЮМЕ. Описаны два новых вида *Habrocestum shendurneyensis* sp.n. (♂♀) and *H. kerala* sp.n. (♂) из заповедника Шендерни, штат Керала, Индия. Приведены детальные описание и изображения, указаны диагностические признаки. На карте показано распространение всех видов известных из Индии.

Introduction

The jumping spider genus *Habrocestum* Simon, is currently known by 49 named species [WSC, 2022]. Of them, 23 species are from Africa, 27 Eurasia (3 species known from both Africa and Eurasia) and one species each from Western Australia and Solomon Island [WSC, 2022]. The genus remains largely unrevised without any species grouping, and about half of the species are known only from their original descriptions [WSC, 2022]. North American *Habrocestum* were revised by Richman [1981] and all of the species considered in the genus have been moved to other genera [Edwards, 2003].

Habrocestum was reported from the Indian subcontinent only recently. So far four species are known from Sri Lanka [Kaneshratnam, Benjamin, 2016, 2020] and one species from South India (1 species) [Sankaran *et al.*, 2019]. The goal of this paper is to describe two new species recently collected in Western Ghats, Kerala, India.

Materials and methods

Specimens were hand collected and preserved in 70% alcohol. Live images were taken using Nikon D80 with 60mm macro lens. They were later examined in detail and photographed with a Leica DFC295 camera attached to the Leica S8APO stereomicroscope. All images were then processed with the aid of LAS version 4.2 software. The epigyne was dissected, cleared in 10% KOH and mounted on a temporary slide and observed under an Olympus CX31 compound microscope. The type material is deposited in the museum of the Department of Zoology, University of Kerala, Kariavattom, India (KUDZ). Abbreviations used in the text are as follows: ALE — anterior lateral eye, AME — anterior median eye, PLE — posterior lateral eye, PME — posterior median eye, RTA — retrolateral tibial apophysis.

Taxonomy

Genus *Habrocestum* Simon, 1876

Habrocestum Simon, 1876: 131; Dalmas, 1920: 61; Richman, 1981: 199; Prószyński, 2003: 65; Wesołowska, 2006: 230.

Type species: *Habrocestum pullatum* Simon, 1876 from France (known only from female).

COMMENTS. Species currently considered in the genus have different copulatory organs. Unless the type species is revised in detail the genus limits may not be circumscribed clearly. The two new species described in this paper are provisionally placed in *Habrocestum* because they share similar chelicera, male palp and epigyne as compared to species considered currently in *Habrocestum* and those occurring in adjacent Sri Lanka. Four species are known from the Island nation, Sri Lanka and three are known from India (including the species being described here) and more spe-



Figs 1–4. Photos of alive *Habrocestum shendurneyensis* sp.n. (1–3) and *H. kerala* sp.n. (4). 1–2, 4 — male holotypes; 3 — female.
Рис. 1–4. Натурные фотографии *Habrocestum shendurneyensis* sp.n. (1–3) и *H. kerala* sp.n. (4). 1–2, 4 — голотипы, самцы; 3 — самка.

cies may be expected in India upon further explorations since most of the Indian landscape is relatively under sampled.

Habrocestum shendurneyensis sp.n.
Figs 1–3, 5–24, 34

TYPE. Holotype ♂ (KUDZEN2021.I.05a) and paratypes 1♂ (KUDZEN2021.I.0805b), 2♀♀ (KUDZEN2021.I.05c & 5d) India, Kerala, Kulathupuzha, Kallar (08°54′46.9″N, 77°06′10.2″E), 30.06.2021 (A. Asima).

ETYMOLOGY. The specific epithet refers to Shendurney Wildlife Sanctuary from where the species was collected.

DIAGNOSIS. Males of *H. shendurneyensis* sp.n. are unique among congeners in having a cap-like modification at the retrobasal portion of cymbium extending over the RTA. *Habrocestum shendurneyensis* sp.n. is most similar to *H. longispinum*, and can be distinguished by the absence of apicomedial tegular lobe at the base of embolus (vs. present); RTA triangular (vs. quadrangular with a finger-like projection directed ventrally) (cf. Figs 14, 15, 19, 20 and figs. 3b–c in Sankaran *et al*. [2019]). Females can be distinguished by the absence of accessory glands (vs. present); long and narrow posterior hood (vs. broad) (cf. Figs 16–18, 20, 21 with figs. 3g, h in Sankaran *et al*. [2019]).

DESCRIPTION. MALE (holotype; Figs 1–2, 5–9, 14–15, 19–20, 23): body length 5.63; carapace 3.30 long, 2.60 wide; abdomen 2.33 long, 1.89 wide. Carapace black, sparsely covered with broad band of white setae along lateral margins (Figs 1, 5). Anterior eyes surrounded with reddish-orange orbital setae (Fig. 9). Eye sizes and interdistances: AME 0.64, ALE 0.38, PME 0.12, PLE 0.33; AME-AME 0.08, AME-ALE 0.86, PME-PME 1.76, PME-PLE 0.28, PLE-PLE 1.63. Clypeus height at AME 0.25, at ALE 0.76. Clypeus black (Figs 9, 23). Chelicerae dark brown (Fig. 8). Sternum dark brown. Legs I & II dark brown and legs III & IV yellow brown with dark brown annulations near joints (Fig. 1). Measurement of palp and legs: palp 4.89 (1.90, 1.03, 0.72, 1.24), I 13.71 (4.01, 2.98, 3.16, 2.61, 1.25), II 9.08 (2.88, 1.89, 1.77, 1.46, 1.08), III 10.51 (3.65, 1.91, 2.09, 1.95, 0.91), IV 7.91 (2.55, 1.13, 1.53, 2.08, 0.62). Abdomen oval, dorsum brownish with 4 pairs of dorso-lateral white spots and median faint chevron shaped markings (Figs 1, 5, 7). Venter brownish (Fig. 6). Spinnerets light brown with yellowish base (Figs 6, 7).

Palp (Figs 14, 15, 19, 20) with dark brown femur, yellowish patella, tibia and cymbium; tibia 2.3 times longer than wide, RTA small, shorter than tibia radius, claw-like, curving inwards at the tip; cymbium long, narrowing towards apex, covered with dark hairs dorsally and prolaterally, with a retrobasal flap (Fig. 20: CE) over the RTA; bulb elongate, almost 2 times longer than wide; tegulum long, with small proximal lobe protruding retrolaterally; embolus arising from under tegular ledge at 9 to 10 o'clock position, curving apically at 12 o'clock position, tapering toward the tip.

FEMALE (Figs 3, 10–13, 16–18, 21–22, 24). Similar to male in color except following: brownish overall without any white spots; sternum light brown; leg I with dark brown femur and yellowish tarsus, legs II–IV yellow brown (Figs 10, 11). Body length 6.48; carapace 3.39 long, 2.88 wide; abdomen 3.09 long, 2.47 wide. Eye sizes and interdistances: AME 0.82, ALE 0.48, PME 0.12, PLE 0.40; AME-AME 0.09, AME-ALE 0.07, PME-PME 2.17, PME-PLE 0.40, PLE-PLE 1.96, Clypeus height at AME 0.27, ALE 0.76. Measurements of palp and legs: palp 3.94 (1.38, 0.82, 0.73, 1.01), I 9.88 (2.82, 2.07, 2.39, 1.47, 1.13), II 8.03 (2.54, 1.62, 1.68, 1.21, 0.98), III 9.10 (3.30, 1.55, 1.83, 1.70, 0.72), IV 8.15 (2.53, 1.18, 1.70, 1.78, 0.96). Epigyne (Figs 16–18, 21, 22) moderately sclerotized with a postero-median hood; 1.4 times wider than long; pair of membranous oval windows arranged medially; copulatory openings placed laterally along margins of membranous windows; copulatory ducts short, tubular; spermathecae multi-chambered with thick walls; fertilization duct originate from anterior part of spermathecae, diverging from each other.

DISTRIBUTION. Known only from the type locality (Fig. 34).

Habrocestum kerala sp.n.
Figs. 4, 25–33, 34.

TYPE. Holotype ♂ (KUDZEN2021.I.06a) and paratype 1♂ (KUDZEN2021.I.06b), India, Kerala, Kulathupuzha, Katilappara (08°54′10.0″N, 77°06′47.7″E), 29.06.2021 (A. Asima).

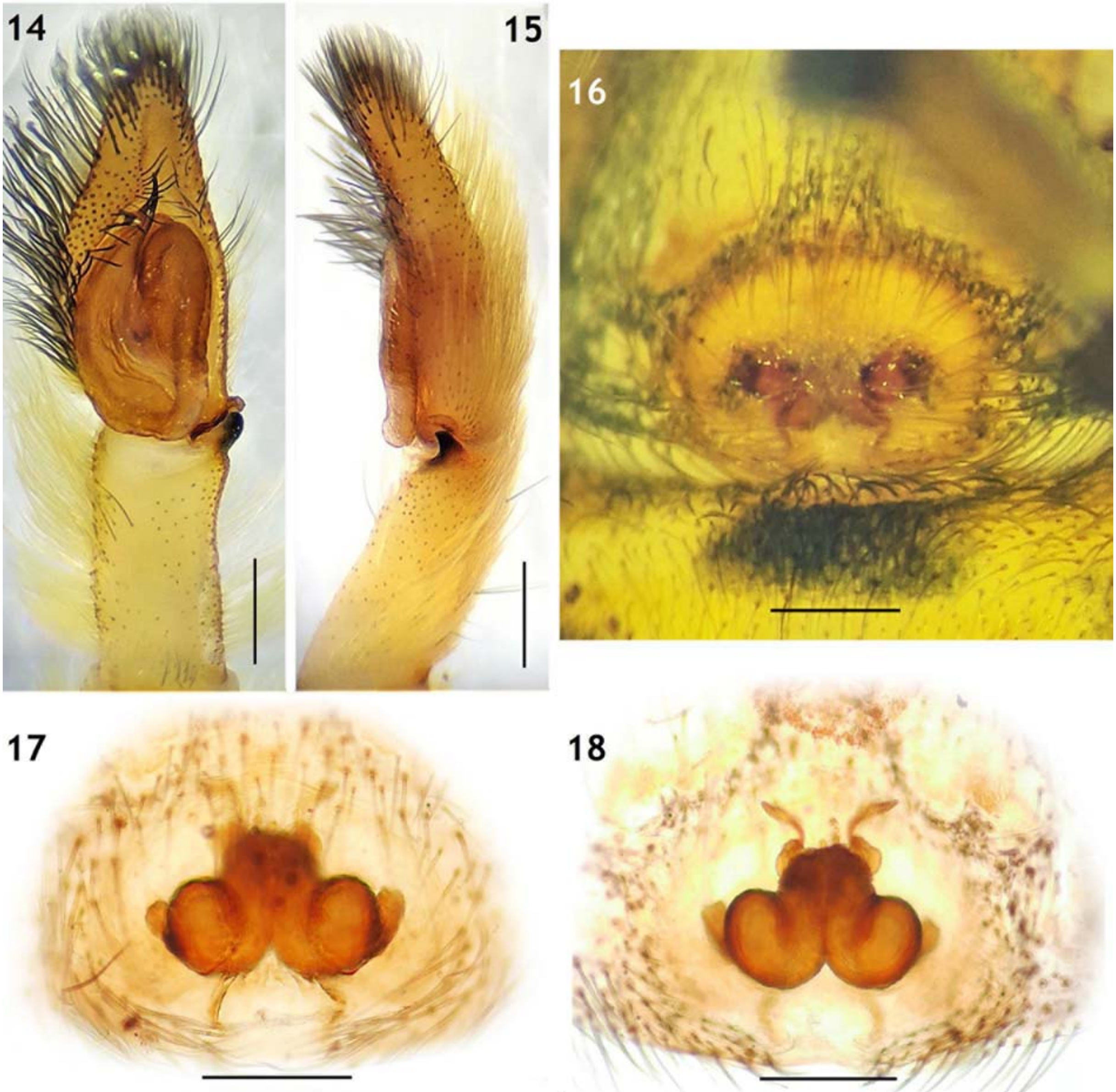
ETYMOLOGY. The specific epithet is derived from the name of the Indian State, Kerala from where the holotype was collected. The name is used a noun in apposition.

DIAGNOSIS. Male palp of *H. kerala* sp.n. is similar to that of *H. hantaneensis* Kanesharatnam et Benjamin, 2016 known from Sri Lanka, and can be distinguished by the broad and bifurcated RTA (vs. finger-like); beak-like curved embolus, (vs. conical); and presence of apicomedial tegular lobe vs. absent) (cf. Figs 29, 30 and figs 5C–D & 6A–B in



Figs 5–13. *Habrocestum shendurneyensis* sp.n. 5–7 — holotype male habitus, dorsal, ventral and postero-dorsal; 8 — left chelicera, posterior; 9 — male, anterior; 10–11 — female habitus, dorsal and ventral; 12 — front view; 13 — left female chelicera, posterior. Scale bars: 2 mm.

Рис. 5–13. *Habrocestum shendurneyensis* sp.n. 5–7 — голотип самец, габитус, дорзально, вентрально и постеро-дорзально; 8 — левая хелицера самца, сзади; 9 — головогрудь самца, спереди; 10–11 — габитус самки, дорзально и вентрально; 12 — самка, спереди; 13 — левая хелицера самки, сзади. Масштаб: 2 мм.

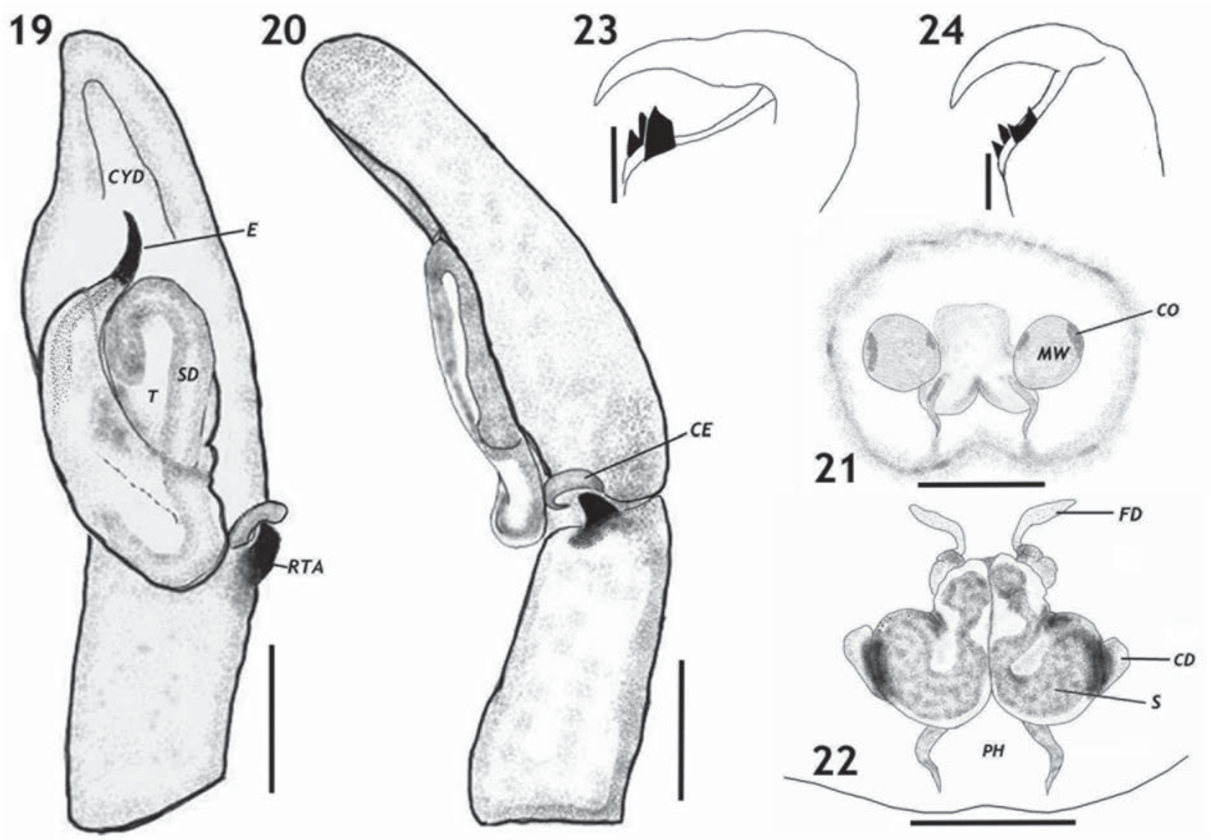


Figs 14–18. Copulatory organs of *Habrocestum shendurneyensis* sp.n. 14–15 —palp of male holotype, ventral and retrolateral; 16 — intact epigyne, ventral; 17–18 — dissected epigyne, ventral and dorsal. Scale bars: 0.2 mm.

Рис. 14–18. Копулятивные органы *Habrocestum shendurneyensis* sp.n. 14–15 — пальпа голотипа самца, вентрально и ретролатерально; 16 — интактная эпигина, вентрально; 17–18 — отпрепарированная эпигина, вентрально и дорзально. Масштаб: 0,2 мм.

Kanesharatnam & Benjamin [2016]). The RTA of *H. kerala* sp.n. is somewhat similar to that of *H. longispinum* in retrolateral view, but rather seems to be more developed in having a conical ventral projection and a disc-like dorsal portion whereas in the latter, the ventral projection is finger-like and dorsal portion appears like a simple hump [Sankaran *et al*., 2019].

DESCRIPTION. MALE (holotype; Figs 4, 25–33: body length: 3.98; carapace 2.58 long, 1.82 wide; abdomen 1.40 long, 1.26 wide. Carapace black with 2 pairs of white spots behind PMEs and PLEs, small longitudinal white band behind fovea; white patch of setae along margins (Figs 4, 25). Eye sizes and interdistances: AME 0.57, ALE 0.31, PME 0.06, PLE 0.20; AME-AME 0.05, AME-ALE 0.08, PME-PME 0.99, PME-PLE 0.16, PLE-PLE 0.90. Clypeus height at AME 0.20, at ALE 0.70. Clypeus blackish (Fig. 26). Chelicerae reddish-brown (Figs 28, 33). Sternum oval, brown. Legs I dark brown except yellow tarsi, with white spot on proximal portion of tibiae; legs II dark brown, part of femora, patellae and tibiae sparsely covered with white setae dorsally; legs III, IV light brown with dark annulations, femora and tibiae covered with white spots (Figs 4, 25, 26). Measurement of palp and legs: palp 2.89 (1.13, 0.73, 0.16, 0.86), I 6.02 (1.86, 1.01, 1.45, 1.04, 0.66), II 4.64 (1.47, 0.84, 0.98, 0.90, 0.45), III 5.34 (1.86, 0.85, 1.06, 1.22, 0.35), IV 4.78 (1.42, 0.69, 0.95, 1.36, 0.36). Abdomen small, oval, dorsum brown with 3 horizontal white bands; light brown chevron shaped patches present postero-medial-



Figs 19–24. *Habrocestum shendurneyensis* sp.n. 19–20 — palp of male holotype, ventral and retrolateral; 21–22 — epigyne of paratype female, dorsal and ventral; 23 — chelicera of male holotype; 24 — chelicera of female paratype. Abbreviations: AG — accessory glands; CD — copulatory duct; CE — retrobasal extension of cymbium; CO — copulatory opening; CYD — cymbial depression; E — embolus; FD — fertilization duct; MW — membraneous window; PH — posterior hood; RTA — retrolateral tibial apophysis; S — spermatheca; SD — sperm duct; T — tegulum. Scale bars: 19–22 — 0.2 mm; 23–24 — 0.5 mm.

Рис. 19–24. *Habrocestum shendurneyensis* sp.n. 19–20 — пальпа голотипа самца, вентрально и ретролатерально; 21–22 — эпигина, дорзально и вентрально. 23 — хелицера голотипа самца; 24 — хелицера самки. Сокращения: AG — дополнительные железы; CD — копулятивный канал; CE — ретробазальный вырост цимбиума; CO — копулятивное отверстие; CYD — цимбиальная впадина; E — эмболюс; FD — фертилизационный канал; MW — окно; PH — задний карман; RTA — ретролатеральный отросток голени пальпы; S — сперматека; SD — сперматический канал; T — тегулюм. Масштаб: 19–22 — 0,2 мм; 23–24 — 0,5 мм.

ly (Figs 25, 27). Venter brownish with creamy yellow lateral stripes. Spinnerets yellow with a tuft of white hairs basally (Fig. 27).

Palp as in Figs 29–32, dark brown, cymbium and patella covered with white setae dorsally; femur length/width 2.89; patella length/width 2.21; tibia as long as wide, RTA wide, bilobed, slightly wider than tibia radius; cymbium long about 3 times longer than wide, tip long, about 1/3 of cymbial length, covered with dark setae prolaterally; tegulum long with well-developed proximal lobe; apicomedial tegular lobe present near base of embolus; embolus short, beak like, curved apically (Figs 26, 29, 30–32).

FEMALE. Unknown

DISTRIBUTION. Known only from the type locality (Fig. 34).

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Compliance with ethical standards

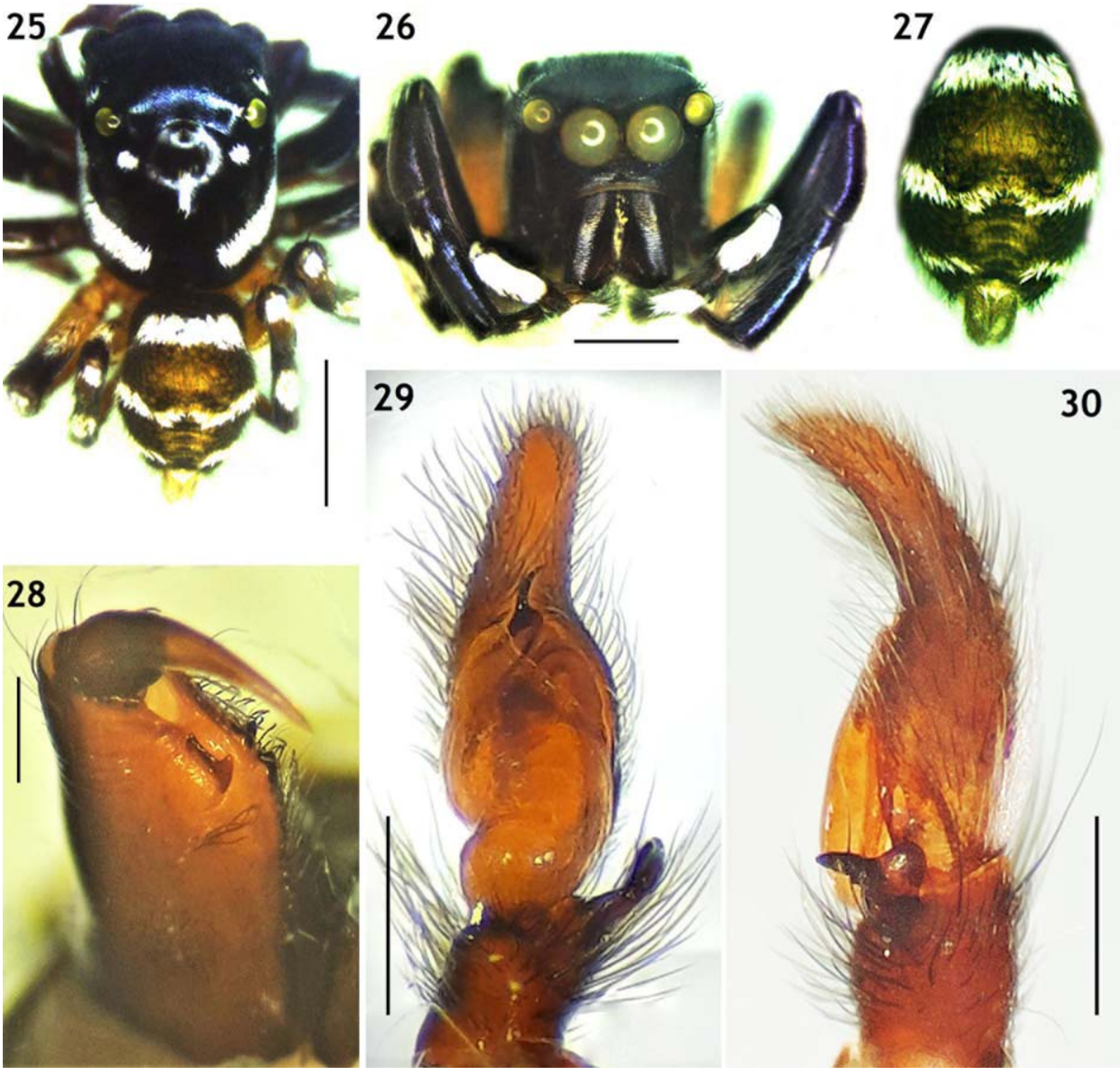
Conflict of interest: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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Figs 25–30. *Habrocestum kerala* sp.n. 25–26 — holotype male habitus, dorsal and anterior; 27 — abdomen, dorsal; 28 — right chelicera, ventral; 29–30 — left palp, ventral and retrolateral. Scale bars: 25–26 — 1 mm; 28–30 — 0.5mm.

Рис. 25–30. Голотип *Habrocestum kerala* sp.n. 25–26 —габитус, дорзально и фронтально; 27 — брюшко, дорзально; 28 — правая хелицера, вентрально; 29–30 — левая пальпа, вентрально и ретролатерально. Масштаб: 25–26 — 1 мм; 28–30 — 0,5 мм.

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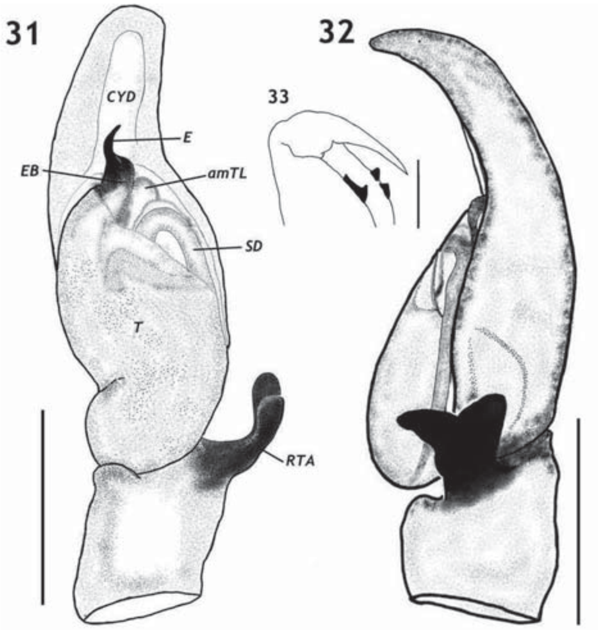
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Figs 31–33. *Habrocestum kerala* sp.n. 31–32 — left palp of male holotype, ventral and retrolateral; 33 — right chelicera of male paratype. Abbreviations: amTL — apicomedial tegular lobe; CYD — cymbial depression; E — embolus; EB — embolic base; RTA — retrolateral tibial apophysis; SD — sperm duct; T — tegulum. Scale bars: 0.5 mm.

Рис. 31–33. *Habrocestum kerala* sp.n. 31–32 — левая пальпа голотипа, вентрально и ретролатерально; 33 — правая хелицера паратипа. Сокращения: amTL — верхне-срединный вырост тегулюма; CYD — цимбиальная впадина; E — эмболюс; EB — основание эмболюса; RTA — ретролатеральный отросток голени пальпы; SD — сперматический канал; T — тегулюм. Масштаб: 0,5 мм.

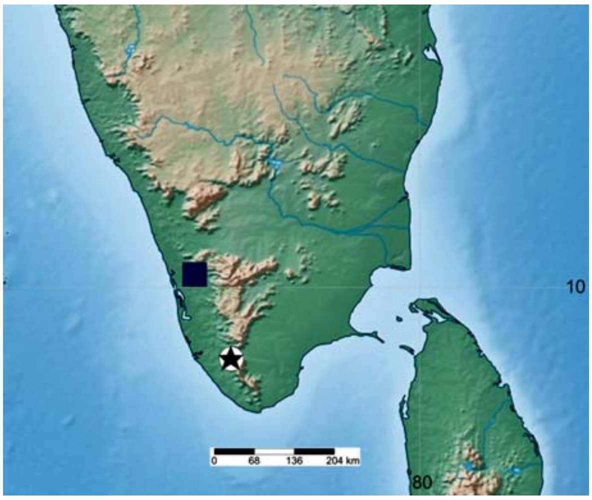


Fig. 34. Type localities of *Habrocestum* species from India. Black star and white circle — *H. shendurneyensis* sp.n. and *H. kerala* sp.n.; blue square — *H. longispinum*.

Рис. 34. Типовые локалитеты видов *Habrocestum* известных из Индии. Чёрная звезда и белый круг — *H. shendurneyensis* sp.n. и *H. kerala* sp.n.; жёлтый квадрат — *H. longispinum*.